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RELATION OF THE COURSE OF STUDY TO HIGHER WAGES¹.

By John Burton Phillips.

Honorable William T. Harris, United States Commissioner of Education, has written: "In the earliest stage of civilization ninety-nine laborers out of each hundred are needed to supply raw material and rude manufactures for the community. With the growth of civilization a larger and larger number are detailed from the one hundred to provide creature comforts, protection and culture, and the teachers vocation in the United States at present by far leads in numbers the other vocations that have to do with providing culture for the community. These vocations are limited in their quotas only by the ability of the community to furnish a surplus of money beyond what is needed for the raw materials and the rude manufactures for food, clothing and shelter. In the future time a goal will be reached when one person in each hundred by means of machinery will furnish all the food, clothing and shelter needed for the other ninety-nine, and everyone of these ninety-nine will find ample employment in the higher occupations which provide means for creature comfort, protection and culture (2)"

What means shall we employ to reach this goal? In the struggle to attain it, ought we not to give some attention to the subjects taught in the schools? If machines are to take the place of men in producing things to satisfy material needs, it will be necessary to train men to make and use machinery.

Progress in civilization depends upon an increase in the production of those commodities that satisfy human wants. To satisfy more wants each individual must secure more commodities. To live better and have more comforts, our people must be able to buy more with their wages and salaries. Wages and salaries are paid from the product the workers are able to turn out, and they are therefore limited by the amount of wealth produced. Higher wages therefore require an increased production. Accordingly, the problem of progress is a problem of increasing production. Each worker must continually turn out a larger product. To expect the American laborer to

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 2. William T. Harris in School and Home Education.

W.C. 1075
P5

work harder or longer hours is out of the question, as the limit of human strength has already been reached; many of our laborers are now working beyond this limit, and injury to their health and to that of those dependent upon them is the inevitable result. The only way to increase production is by a constant increase in the invention and use of labor-saving machinery. When machinery is used, production is limited only by the forces of nature instead of human strength as is the case with workers without machines.

Modern civilization is thus very largely the outgrowth of machinery. Increase in the invention and use of labor-saving machinery is therefore essential to progress. What effect should these facts have on those whose duty it is to arrange the course of study?

It at once occurs to every thoughtful person that the studies taught in the schools should be such as will lead the students to familiarize themselves with the social and industrial effects of machine industry and its relation to modern progress. Industrial history should be one of the leading studies in all schools. Children in the lower grades should be taught the stories of great inventions, and the industrial effects of these inventions should be thoroughly impressed on their minds.

Of the various movements contributing to produce modern civilization, none was more important than the industrial revolution. Yet, multitudes of our teachers have never heard of this. The contributions of inventors and labor-saving machinery to our civilization have always been largely overlooked by educators. Education has done little to encourage invention. Here is a table showing the amount of schooling enjoyed by the men whose inventions have contributed most to the welfare of the world:

Inventor	Invention	Date	Education
Franklin	Lightening rod	1752	No education *
Hargreaves	Spinning jenny	1764	Illiterate
Arkwright	Spinning frame	1769	No education
Watt	Steam engine	1769	Rudimentary common school
Crompton	Spinning mule	1779	No education
Cartwright	Power loom	1785	Oxford graduate
Fitch	Steam navigation	1787	Rudimentary common school
Whitney	Cotton gin	1793	Yale graduate
Evans	Steam navigation	1804	No education
Fulton	Steam navigation	1807	No education
Davy	Safety lamp	1815	Rudimentary common school
Stephenson	Locomotive	1821	No education
McCormick	Reaper	1834	No education
Morse	Telegraph	1843	Yale graduate
Goodyear	Vulcanized rubber	1843	No education
Howe	Sewing machine	1845	Rudimentary common school
Singer	Sewing machine	1850	No education
Bessemer	Steel manufacture	1856	Rudimentary common school
Ericsson	Monitor	18861	No education
Bell	Telephone	1876	Edinburgh graduate
Edison	Electric light	1880	No education

* The words, "No education" as used in this table mean absence of school or college opportunities.

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From this table it appears that the great inventors have been men to whom public education has been very largely denied. The inspiration for their service to humanity did not come save in very few instances from the schoolroom. Why should so important a subject as the application of the forces of nature to what is now performed by human labor, be neglected in educational institutions?

There does not appear to be any good reason why a course in invention should not be offered in the higher institutions of learning. A course in which students would be made to realize the industrial needs that can be supplied by new inventions, might easily be given. One great reason why more inventions are not made is due to the fact that students are not trained to recognize economic waste. Why were improvements in harvesters so slow in coming? No attempt was made to invent harvesting machinery by anyone but the farmers. The invention of spinning machinery was left to spinners. The needle and thread were used for centuries but nobody tried to invent a sewing machine till 1844. Literature was taught in the schools, but no attention was given to pointing out great industrial needs. More labor-saving inventions would have been made years earlier had education pointed out to our young men the need of machinery in industry.

Since progress has been greatly limited by the absence of industrial instruction, is it not time that this error be corrected by so adjusting the curriculum that those trained in the schools will be prepared to see and remedy industrial defects by the invention of machinery? If the time desired by Commissioner Harris shall ever come when one man with machines will provide the material comforts for ninety-nine other men, and these ninety-nine be left free to devote themselves to art, literature and other cultural studies, that time will not be hastened by a course of study which provides for teaching art and literature in the schools to the neglect of industrial subjects. On the contrary, such a time will be hastened just in proportion as the importance of machinery in our civilization and the necessity of further labor-saving inventions, are brought home to our people by means of education. Higher wages being dependent upon increased production and increased production depending upon a greater use of machinery, it would seem to be the plain duty of educators to so modify the course of study that students may be able to understand thoroughly the industrial system and remedy its defects by new inventions. In this way the production of wealth would be increased and the resulting higher wages would give to our people a greater command over the comforts and pleasures of life.

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